

CLAIMS

We claim:

1. An image sensor, comprising:  
a sensor array comprising a two-dimensional array  
5 of pixel elements, said sensor array outputting digital  
signals as k-bit pixel data representing an image of a  
scene;  
a companding circuit for companding said k-bit  
pixel data into h bits, h being less than k; and  
10 a data memory, in communication with said sensor  
array, for storing said h-bit pixel data for each of  
said pixel elements.
2. The image sensor of Claim 1, wherein said  
companding circuit comprises a look-up table containing  
15 values for mapping a k-bit number to a h-bit number.
3. The image sensor of Claim 1, wherein  $h=k-1$ .
4. The image sensor of Claim 1, wherein said  
companding circuit applies a transfer function for  
companding said k-bit pixel data into h bits, said transfer  
20 function being a linear function at low intensity values and  
a logarithm function at high intensity values.
5. The image sensor of Claim 1, wherein said transfer  
function increments said k-bit pixel data in step size less  
than a perceptible threshold of the human visual capability.
- 25 6. A method for generating electrical signals  
representing an image in a digital image sensor, comprising:  
generating digital signals as k-bit pixel data,  
said pixel data being associated with each pixel  
element in a sensor array of pixel elements and

corresponding to a level of an analog signal indicative of a light intensity impinging on said pixel element;

companding said k-bit pixel data into h bits for a first one of said pixel elements, h being less than k;

5 and

storing said h-bit pixel data in a location in a data memory associated with said first one of said pixel elements.

7. The method of Claim 6, wherein said act of  
10 companding comprises mapping a k-bit number to a h-bit number using a look-up table.

8. The method of Claim 6, wherein  $h=k-1$ .

9. The method of Claim 6, wherein said act of  
companding comprises applying a transfer function for  
15 companding said k-bit pixel data into h bits, said transfer function being a linear function at low intensity values and a logarithm function at high intensity values.

10. The method of Claim 6, wherein said transfer  
function increments said k-bit pixel data in step size less  
20 than a perceptible threshold of the human visual capability.